

5G/6G mobile communication practical training and course ideological and political construction

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Abstract: This paper discusses the importance of conducting practical training in the field of 5G/6G mobile communication in line with the current development trends of the mobile communication sector and the demands for ideological and political construction of university courses. It proposes corresponding teaching methods and measures for ideological and political construction. First, it introduces the development background and characteristics of 5G/6G mobile communication technology, explaining its significant role in the future development of society. Then, it explores the significance of implementing practical training in university mobile communication courses and analyzes the role of practical training in enhancing students' comprehensive abilities. Next, based on the latest research achievements and practical experiences in mobile communication technology, it proposes a practice-based teaching model that combines theoretical teaching, experimental operations, and project practice. Finally, the paper discusses how mobile communication practical training can promote students' ideological and political education, improve their moral and social responsibility, and lay a solid foundation for them to grow into well-rounded socialist builders and successors with moral, intellectual, physical, aesthetic, and labor education.

Keywords: 5G/6G Mobile Communication, Practical Training, Course Ideological and Political Construction, Comprehensive Ability, Ideological and Political Education

1. Introduction

With the rapid development of technology, mobile communication technology is becoming an indispensable part of people's lives and work. Especially in recent years, the commercial promotion of 5G technology and the research progress of 6G technology have brought new development opportunities and challenges to the communication field. As part of university education, the setup and teaching methods of mobile communication courses need to keep pace with the times, fully meeting students' learning needs and the developmental requirements of society. Moreover, as an important part of the current reform of university education, the construction of course ideology and politics needs to be integrated into the teaching of various disciplines, guiding students to establish correct views on life, values, and social responsibility. Therefore, combining the latest developments in the mobile communication field with the requirements of course ideological and political construction, this paper explores how to promote students' comprehensive ability improvement through 5G/6G mobile communication practical training and guide them to establish correct ideological and political concepts, contributing to the cultivation of excellent talents for the construction of a modern socialist country.

2. 5G/6G Mobile Communication Technology Overview

2.1 The Development History of 5G/6G Mobile Communication Technology

The development of mobile communication technology can be traced back to the end of the 20th century, from the analog communication of the 2G era to the ultra-high-speed digital communication of the 5G era, with each generation of technology evolution marking a new milestone in the field of communication.

In the 2G era, mobile communication was mainly based on analog signals, with low communication quality primarily used for voice calls and limited data transmission rates. However, with the development of digital technology, the advent of the 3G era marked the mobile communication's step into the digital age. The emergence of 3G technology significantly improved data transmission rates, supported more applications such as text messages and image transmission, and laid the foundation for

the development of mobile internet.^[1]

The popularization of 4G technology brought mobile communication into the high-speed era. 4G technology provided faster data transmission speeds and more stable network connections, supporting large-capacity data transmission such as high-definition video and online gaming. With the commercialization of 5G technology, mobile communication has entered the ultra-high-speed era. Characterized by millisecond-level low latency, transmission speeds a hundred times faster than 4G, and a connection density thousands of times greater than 4G, 5G offers broader application prospects in fields such as the Internet of Things, intelligent transportation, and smart manufacturing.^[2]

In the future, with the continuous development of technology, 6G technology is expected to become a new hallmark of mobile communication. 6G technology is anticipated to further increase transmission speed, reduce latency, enhance network capacity, and possess more intelligent network management and resource scheduling capabilities. 6G is expected to be applied in more areas, such as virtual reality, augmented reality, artificial intelligence, and more, driving technological progress and societal development.

2.2 Characteristics and Application Prospects of 5G/6G Mobile Communication Technology

5G/6G mobile communication technology has the following characteristics and application prospects. First, ultra-high speed is one of the notable features of 5G/6G technology. These technologies offer higher data transmission rates than ever before, supporting faster download and upload speeds and providing more efficient solutions for large-capacity data transmission. Second, low latency is another important feature of 5G/6G technology. Millisecond-level low latency makes real-time applications possible, such as remote healthcare and autonomous driving, bringing more convenient experiences to people's lives and work. Additionally, high connection density is another characteristic of 5G/6G technology.^[3] They support more devices being connected simultaneously, offering broader space for the development of the Internet of Things and enabling intelligent applications such as smart homes and smart cities. Moreover, wide coverage is a significant advantage of 5G/6G technology. They can achieve broader coverage areas, including urban, rural, and even marine and aerial environments, providing a more reliable infrastructure for global communication. Lastly, intelligent applications are a potential direction for 6G technology. 6G technology is expected to further develop on the basis of 5G, achieving more intelligent communication systems, including intelligent sensing, recognition, and decision-making functions, offering stronger support for the development of fields such as artificial intelligence and virtual reality. In summary, 5G/6G mobile communication technology has tremendous development potential and broad application prospects, bringing unprecedented changes and development opportunities to human society.^[4]

3. The Significance and Methods of Practical Training in Mobile Communication

3.1 The Role of Practical Training in Cultivating Students' Comprehensive Abilities

3.1.1 Hands-on Participation to Exercise Practical Operational Skills

Practical training in mobile communication plays a significant role in the cultivation of students' comprehensive abilities. Through hands-on operation and project practice, students are able to integrate classroom theoretical knowledge with practical application, thus developing all-around abilities. Among these, practical operational ability is one. By actively participating in the operation of network equipment and configuration of communication systems, students master related technologies and methods. This training in practical operations helps students adeptly acquire the operational skills needed in actual work, enhancing their adaptability and practical operational ability in real-world settings.^[5]

3.1.2 Analyzing and Solving Problems to Foster Innovative Thinking

During practical training, students often encounter various technical difficulties and practical issues, requiring analysis, reflection, and resolution to complete experimental tasks, thereby enhancing problem-solving abilities and innovative thinking. Through the process of solving real problems, students not only deepen their understanding of theoretical knowledge but also cultivate the ability to identify, analyze, and solve problems. This exercise aids students in developing the adaptability and innovation needed to comfortably tackle complex problems and face various challenges more adeptly in their future work.

3.1.3 Group Cooperation to Develop Teamwork Skills

In the practical training process, students are required to cooperate and coordinate with their peers in groups to complete experimental tasks, cultivating a spirit of teamwork and communication abilities. Through the process of teamwork, students learn to listen to others' opinions, resolve conflicts, and collaborate, developing awareness and abilities for team cooperation. This teamwork training not only helps students learn how to cooperate with others in practice but also fosters their leadership skills and team spirit, laying a solid foundation for their future career.^[6]

In summary, practical training in mobile communication through hands-on operation, problem-solving, and teamwork, comprehensively cultivates students' abilities, enabling them to meet various challenges in their future work and life, and contribute their strength to the development of society and the industry.

3.2 Methods and Means of Practical Training in Mobile Communication

3.2.1 Simulation Experiments and Virtual Experiment Platforms

To effectively enhance students' learning outcomes and practical abilities, various methods and means are utilized in practical training for mobile communication. Among them, conducting simulation experiments using simulation software or virtual experiment platforms is a common method. This approach allows for the simulation of the operation of mobile communication systems, enabling students to perform experimental operations in a virtual environment, which reduces the cost of experiments and improves efficiency. Students can perform various operations and adjustments in simulation experiments, deepening their understanding and mastery of mobile communication technology.

3.2.2 Laboratory Practice

Laboratory practice is an indispensable part of practical training in mobile communication. Through the use of laboratory equipment and tools, students personally operate network equipment, configure communication systems, etc., conducting real experimental operations. Such hands-on operations allow students to more intuitively understand the actual operation of mobile communication technology, enhancing their grasp of theoretical knowledge. Laboratory practice also provides students with a platform for practical operations, cultivating their hands-on abilities and practical skills.

3.2.3 Project Practice

In addition to laboratory practice, project practice is also a crucial means of practical training in mobile communication. Students participate in the design, development, and implementation of mobile communication projects, applying what they have learned to real projects, which exercises their ability to solve practical problems and teamwork skills. Through project practice, students can not only combine theoretical knowledge with actual work but also cultivate their innovation consciousness and practical abilities, laying a solid foundation for their future career development.

In summary, practical training in mobile communication adopts various methods and means, including simulation experiments and virtual experiment platforms, laboratory practice, and project practice, providing students with rich learning resources and practical platforms, comprehensively enhancing their learning outcomes and practical abilities.

4. Design of a Practice-Based Teaching Model

4.1 Integration of Theoretical Teaching and Experimental Operations

4.1.1 Importance of Theoretical Teaching

Theoretical teaching plays a crucial role in the design of a practice-based teaching model. Through theoretical teaching, students can systematically learn relevant knowledge in the field of mobile communication, including communication principles, network architecture, protocol standards, and more. Teachers can conduct theoretical teaching through classroom lectures, textbook reading, multimedia teaching, etc., helping students build an overall understanding and framework of mobile communication theoretical knowledge. Clear explanations and rich case analyses help students deeply understand concepts and principles, while teachers should also guide students to actively learn, expanding their knowledge base through extracurricular reading, online resources, and other means,

enhancing the breadth and depth of learning.

4.1.2 Importance of Experimental Operations

Experimental operations are equally crucial in the design of a practice-based teaching model. Through experimental operations, students can apply theoretical knowledge to practice, deepening their understanding and mastery of the learned knowledge. Experimental operations can be conducted in various forms, such as laboratory classes, lab practice, simulation software, etc. Students transform theoretical knowledge into practical abilities through actual operations like manipulating equipment and configuring systems. Teachers can design a series of experimental tasks to gradually guide students in mastering basic operational skills and evaluate and guide students through experiment reports and demonstrations.

4.1.3 Comprehensive Application of the Teaching Model

The integrated application of theoretical teaching and experimental operations, constructing a complete practice-based teaching model, is vital for enhancing students' comprehensive abilities. The combination of theoretical teaching and experimental operations not only helps students establish a systematic understanding of mobile communication theoretical knowledge but also enables them to acquire practical operational skills, thereby comprehensively improving their overall abilities in the mobile communication field. The design of this teaching model not only aids students in deepening their learning and understanding of the knowledge in the field of mobile communication but also cultivates their problem-solving abilities, innovative consciousness, and teamwork skills, laying a solid foundation for their future career development.

4.2 Integration of Project Practice and Social Practice

4.2.1 Importance of Project Practice

Project practice is a crucial component of the design of a practice-based teaching model. By participating in the design, development, and implementation of specific projects, students can apply the theoretical knowledge learned to actual engineering projects, exercising their problem-solving abilities, teamwork skills, and other comprehensive abilities. Teachers can organize students to participate in various mobile communication projects, such as network planning, system optimization, application development, etc., allowing students to grow and progress through project practice.

4.2.2 Significance and Role of Social Practice

Social practice is another important component of the design of a practice-based teaching model. By participating in actual social projects, students can gain a deeper understanding of the industry's development trends and technical needs, enhancing their awareness and understanding of the mobile communication industry, and improving their practical abilities and professional qualities. Sending students into real work environments to cooperate with enterprises or research institutions for genuine engineering practice and research work allows students to learn and grow in practice.

4.2.3 Importance and Advantages of Integrating Practice

The combination of project practice and social practice enables students to not only engage in project practice within the school's teaching environment but also step out of campus and into society, experiencing work practice firsthand and truly integrating theory with practice. The design of this teaching model provides students with a more practical learning experience, promoting the comprehensive enhancement of their abilities. Simultaneously, by integrating project practice with social practice, students can not only enhance their professional skills but also cultivate innovative consciousness, teamwork spirit, and practical abilities, laying a solid foundation for their future career development.

5. Integration of Mobile Communication Practical Training with Ideological and Political Education

5.1 The Role of Practical Training in Students' Ideological and Political Education

5.1.1 Cultivating a Sense of Responsibility

In mobile communication practical training, students are required to strictly adhere to operational

procedures and safety standards, demanding a high level of responsibility and mission. The cultivation of this sense of responsibility is crucial for students' ideological and political education. Through hands-on operations and project practice, students undertake responsibilities in experimental tasks, experience the importance of responsibility, and gradually establish a sense of responsibility towards the team and work.

During practical training, the responsibility students take on is not just about completing tasks but also about being accountable for the success and safety of the team. They need to understand and comply with operational procedures to ensure the safety of the laboratory and team. Moreover, for project practice, students are expected to fully apply their professional abilities to ensure the smooth progress of the project. This sense of responsibility is not only reflected in individual actions but also in attention to teamwork and collective interests.

By taking on responsibilities, students can realize their importance within a team and the responsibilities they should bear in future work. This not only helps them establish correct professional concepts and work attitudes but also cultivates their team spirit and sense of collective honor. Therefore, practical training plays a significant role in cultivating students' sense of responsibility, providing strong support for their ideological and political education.

5.1.2 Cultivating Team Spirit

Practical training is often conducted in groups, where students need to cooperate and coordinate within the team to complete experimental tasks. In this process, students are not just individuals but indispensable parts of a team. Facing challenges and solving problems together with classmates, they gradually develop team spirit and a sense of collective honor. This team cooperation experience makes students realize that the power of a team far exceeds individual capabilities, understand the importance of teamwork, and gain experience and wisdom from team cooperation. This not only strengthens mutual trust and respect among students but also promotes their common growth and the formation of team consciousness.

5.1.3 Cultivating a Correct View of Competition and Innovation Consciousness

In practical training, students face competition from classmates and pressure from themselves, but guidance and motivation from teachers turn competition into a driving force for cooperation and mutual progress. Such a teaching environment helps students establish a correct view of competition, realizing that competition with others should be based on cooperation and win-win situations. Meanwhile, in the process of practice, students face various technical difficulties and practical issues, requiring them to have an innovation consciousness and practical abilities. Through independent thinking, exploration, and practice, students can develop innovative thinking and improve problem-solving abilities. This competitive and innovative environment encourages students to continuously challenge and surpass themselves, thereby cultivating a correct view of competition and a positive innovation consciousness.

5.2 Guiding Students to Establish Correct Ideological and Political Concepts

5.2.1 Teacher Demonstration and Guidance

In mobile communication practical training, the role of teachers as models is crucial. They are not only the conveyors of knowledge but also role models for students' values and behavioral norms. Through their words and actions, teachers can instill correct ideological and political concepts in students.

The sense of responsibility, team spirit, and identification with socialist core values demonstrated by teachers in their daily actions profoundly influence students, guiding them to establish correct ideological and political concepts. The professionalism and dedication reflected in teachers' demeanor can subtly influence students, gradually helping them to establish correct professional ethics and life values.

5.2.2 Conducting Ideological and Political Education Activities

Ideological and political education activities, such as themed lectures, seminars, and class meetings, are integrated into the practical training curriculum. Through these activities, students can learn about the Party's policies and national laws and regulations, strengthening their ideological and political concepts. These educational activities not only deepen students' understanding of national policies and legal regulations but also guide them to correctly deal with social hot issues, enhancing their ideological and political literacy. Participating in these activities allows students to gain a deeper

understanding of the country's policy direction, strengthen their identification with socialist core values, and provide important ideological and political guidance for their growth and development.

5.2.3 Emphasizing Team Building

Focusing on team building during practical training is very important. Cultivating students' collectivism spirit and teamwork awareness can promote mutual exchange and collective growth among students, establishing a correct concept of teamwork and a sense of collective honor. In group cooperation and collective discussions, students learn to respect and trust others, understanding that individual power is limited and unity is key to achieving greater success. This team building not only helps students better complete practical training tasks but also cultivates their abilities to coordinate and progress together within a team. Through team-building activities, students will more profoundly appreciate the importance of teamwork, thereby better adapting to team environments in future work and life, achieving greater success.

6. Conclusion

Through the research and analysis presented in this paper, it can be concluded that against the backdrop of the rapid development of 5G/6G mobile communication technology, conducting mobile communication practical training can not only enhance students' professional capabilities but also promote their ideological and political education, cultivating well-rounded socialist builders and successors with moral, intellectual, physical, aesthetic, and labor education. Therefore, universities should strengthen their support and investment in mobile communication practical training, making a positive contribution to the comprehensive development of students and the long-term development of the country.

References

- [1] Liu Qiuyan. *Thoughts on Intelligent Metasurfaces Empowering 5G-A/6G Networks* [J]. *Radio Communication Technology*. 2024(02): 8.
- [2] Wei Haoren. *Development and Evolution of Mobile Communication Wireless Resource Scheduling* [J]. *Journal of Hunan Post and Telecommunication Vocational Technical College*. 2023, 22(04): 6-11.
- [3] Wang Gui. *Research on Skill Cultivation and Integration of Course Ideological and Political Education under the Vision of 5G Virtual Simulation* [J]. *Journal of Hunan Post and Telecommunication Vocational Technical College*. 2023, 22(04): 77-81.
- [4] Gu Yanhua. *Exploration and Practice of Course Ideological and Political Education of "5G Communication Technology" under the Perspective of Industry-Education Integration* [J]. *Western Quality Education*. 2023, 9(23): 1-4.
- [5] Hu Denghua. *Exploration and Practice of Ideological and Political Teaching in Basic Communication Technology Courses* [J]. *Higher Education Journal*. 2023, 9(02): 189-192.
- [6] Yu Tianqi. *Theoretical Research and Practical Exploration of Ideological and Political Construction in Communication Principles Course* [J]. *Higher Education Journal*. 2022, 8(22): 94-98.